MISO LIMS

HTS Management by Earlham Institute and Ontario Institute for Cancer Research (OICR)

MISO Purpose

- Track samples processing into libraries
  - Follow samples (DNA extracts) through library preparation and pooling for sequencing
- Collect metadata for SRA submission
- Monitor sequencer output and provide notifications and metrics
  - Allow use of different sequencing platforms, including Illumina, PacBio, 454, and Solid
- Enable inter-team communication and high-level reporting
- Provide a mature, open and extendable alternative for lab tracking

Background

MISO is a inventory tracking system for HTS sequencing labs. Currently developed in a highly coordinated cross-institute effort.

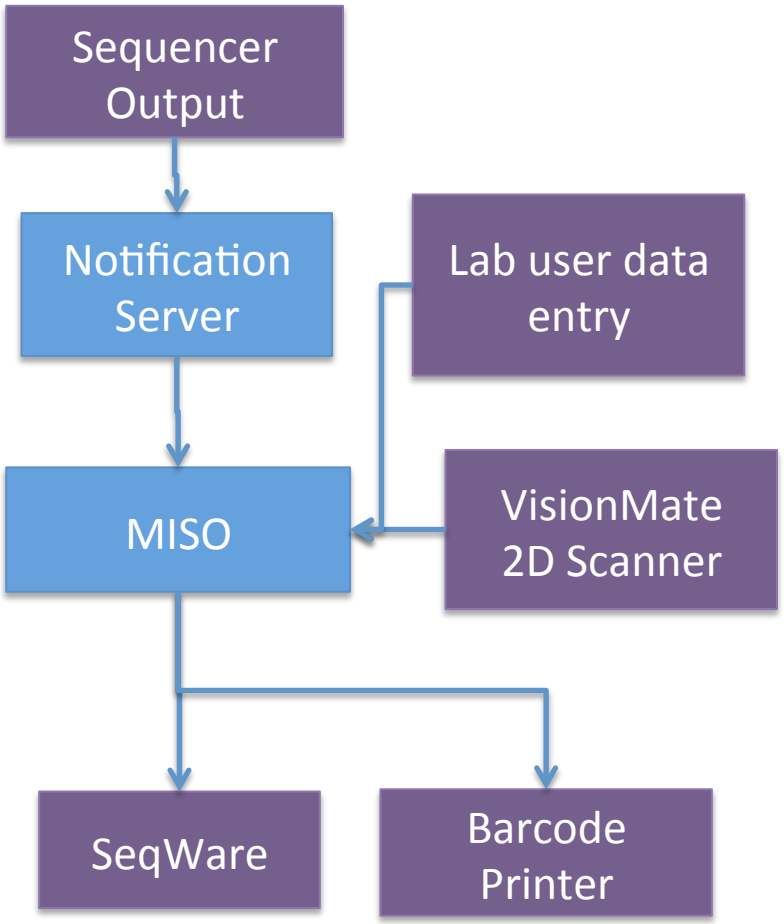
OICR has a HTS sequencing lab

- Managed through Geospiza GeneSifter LE LIMS
- Geospiza was getting too expensive and feature requests weren't being added
- Geospiza is proprietary software and thereby inhibiting to improvements to workflows for lab users

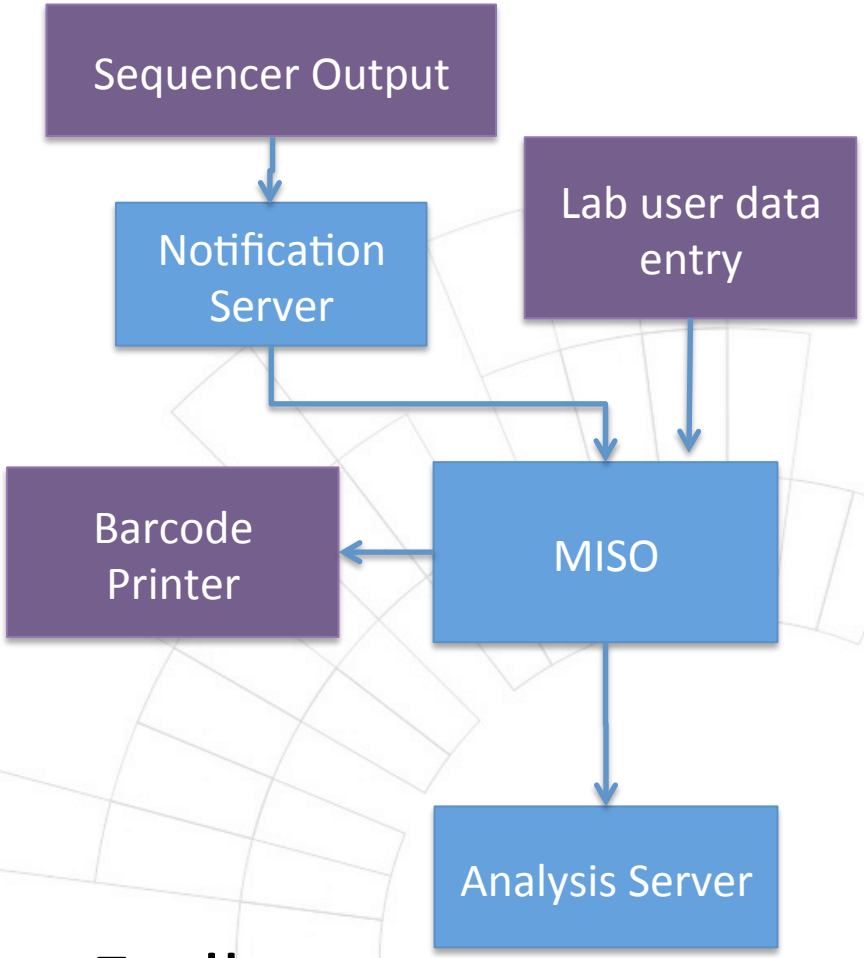
Earlham (formerly TGAC) has a HTS sequencing lab

- Developed in house LIMS (previously presented)
- Mostly small feature and maintenance work
- OICR manager visited and…collaboration!

Architecture



OICR



Earlham

Together? Forever?

But It Works on My Machine

- OICR and Earlham have similar, but distinct needs
  - Earlham mostly handles DNA extracts, OICR handles tissue samples, slides, and extracts
  - Similar set of instruments, but OICR mainly uses LIMS to track Illumina, Earlham Illumina and PacBio
  - OICR has legacy data in Geospiza
- OICR did not want to fork MISO entirely
  - We worked out a development plan to integrate OICR features into Earlham's mainline
  - Some are useful, some are irrelevant to Earlham

Social Aspects

MISO now actively developed by Earlham and OICR

- 1 developer at Earlham
- 4 developers at OICR (until Geospiza sunset)
- All active work visible on GitHub
- Code reviews for everything with at least two developers
- All features integrated into mainline (site-specific repositories are mostly configuration)

New Developments

New Features

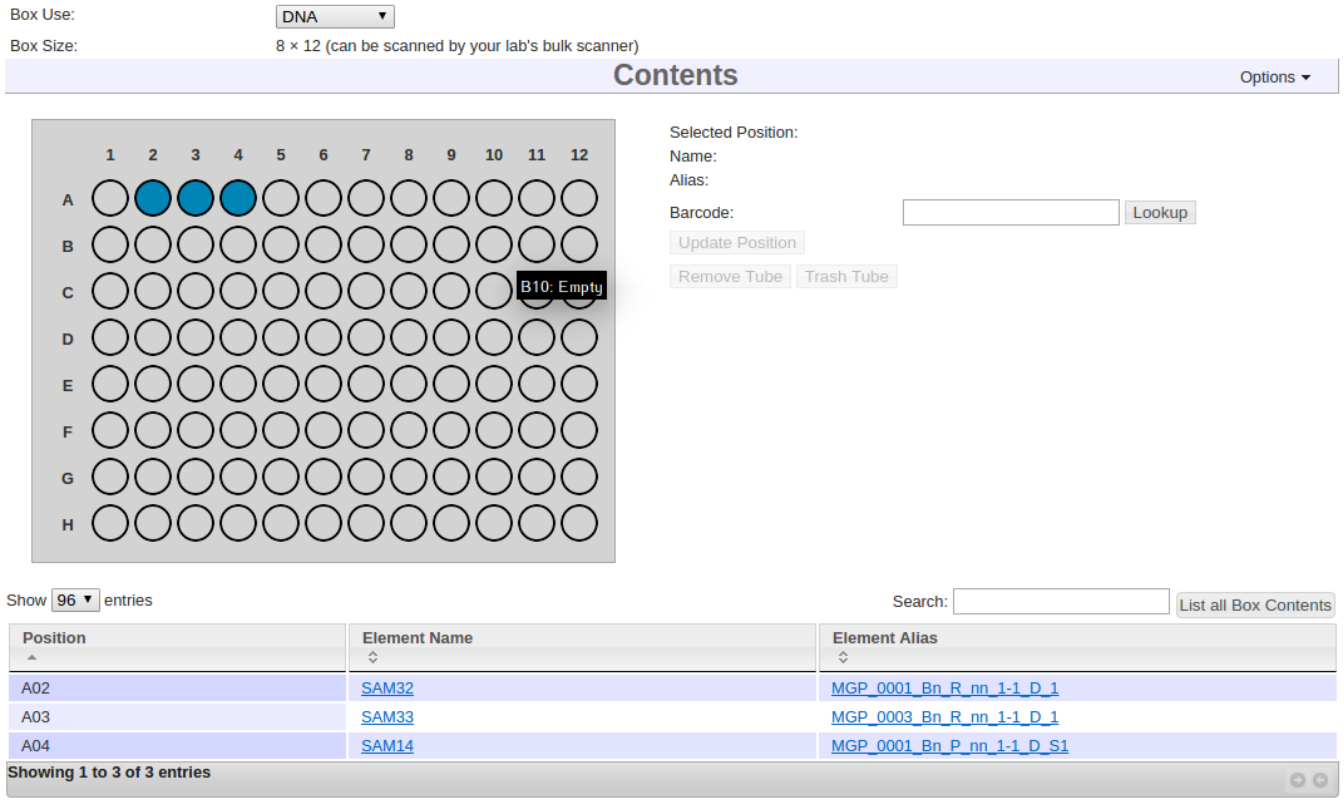
- Tissue processing workflow
  - Bulk input via Handsontable (Excel-like web interface)

Save

	Library Alias	Sample Alias	Description	Matrix Barcode	Platform	Type	Selection	Strategy	Barcode Kit	Index 1	Index 2	Kit	Volume	Conc.
1		MGP_0003_Bn_P_nn_1-1_D_S1			Illumina	Mate Pair	RT-PCR	AMPLICON	TruSeq Single Index	Index 01 - ATCACG		TruSeq RNA Access	0.0	0.00
2		MGP_0002_Bn_R_nn_1-1_D_S1			PacBio	2kb Shotgun	Hybrid Selection	WGS	No barcode			KAPA Hyper Prep	0.0	0.00
3		MGP_0001_Bn_R_nn_1-1_D_S1			Illumina	Single End	DNAse	CLONE	Nextera Dual Index	N701 - TAAGGCGA	N501 - TAGATCGC	Nextera DNA	0.0	0.00

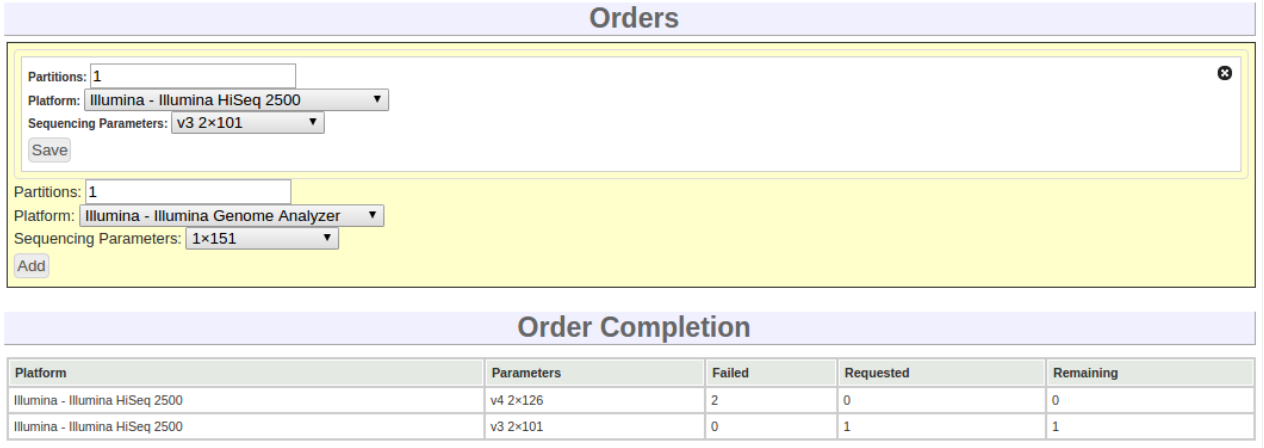
New Features

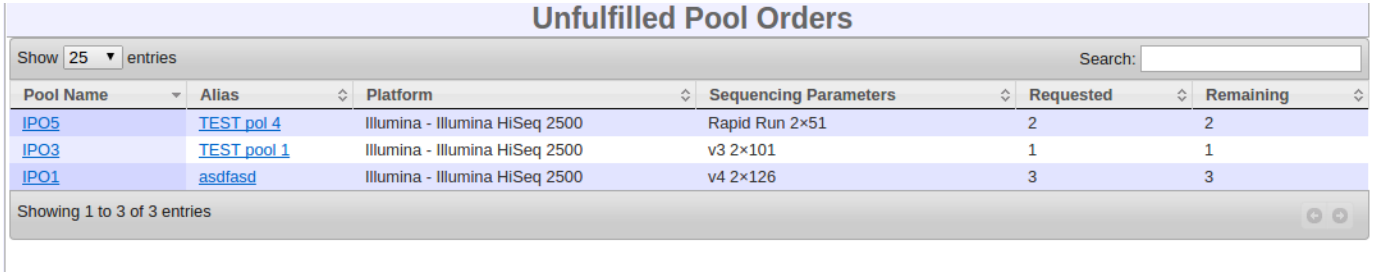
- Storage boxes for handling frozen barcoded tubes
- Scanner integration in the UI



New Features

- Order management
  - Track what needs to be sequenced with what chemistry





New Features

- Front-end input validation

- Change logs

Changes

Summary	Time
admin has changed: ready: 1 → 0	2016-06-17 22:08:08.0
admin has changed: QC passed: n/a → 1, ready: 0 → 1	2016-06-07 14:09:07.0
admin1 has changed: ready: 1 → 0	2016-04-25 19:24:38.0
admin created pool.	2016-04-25 19:19:40.0
admin Added: LDI1	2016-04-25 19:19:40.0

New Procedures

Shared development

- *Everything* gets code reviewed
- Improved testing and plans for more

More plug-and-play

- Externalization of configuration
- Weekly releases at OICR
- Fewer Earlham-specific assumptions

Future Plans

Tissue processing workflows

- Currently, OICR-specific; Earlham intends to use, so will be generalised
- OICR has variable workflow, so this will expand anyway

Better UI

- Excel-like Handsontable used in new developments, will be applied to existing data import
- Customisable reporting

Availability

- Source available on GitHub
- Docker container available for low-effort testing
- On my laptop! Find me and request a demo

https://github.com/TGAC/miso-lims

http://miso-lims.slack.com

New institutes welcome.
We're developing a community.

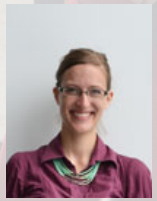
Team

Rob Davey (Earlham)

Tony DeBat (OICR)

Chris Salt (Earlham)

Andre Masella (OICR)



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http://earlham.ac.uk/davey-group

http://bit.do/oicrgsi

Funding provided by: